CLAIMS

It is claimed:

1. A valve control body, comprising:

a control body;

opposing solenoid coils positioned at respective ends of the control body; and

a spool positioned within a bore of the control body and between the opposing solenoid coils, the spool including a mechanism which at least minimizes fluid accumulation between an end of the spool and at least one of the opposing solenoid coils.

2. The valve control body of claim 1, wherein the mechanism includes a seal seated within a groove of the spool and in slidable contact with a wall of the bore of the control body.

3. The valve control body of claim 2, wherein the seal is an O-ring arranged about a circumference of the spool.

4. The valve control body of claim 2, wherein the seal is positioned proximate to a first end of the control body.

5. The valve control body of claim 1, further comprising a minimized contact surface area between the spool and at least one of the opposing solenoid coils.

6. The valve control body of claim 1, wherein the mechanism is a geometric shape formed into a portion of the spool.

7. The hydraulically controlled valve control body of claim 6, wherein the geometric shape is a plurality of triangular shaped grooves.

8. The valve control body of claim 7, wherein the plurality of triangular shaped grooves provide a pumping of fluid away from at least one of the opposing solenoid coils.

9. The valve control body of claim 8, further comprising a minimized contact surface area between the spool and at least one of the opposing solenoid coils.

10. The valve control body of claim 1, further comprising a drainage system in fluid communication with the mechanism, the mechanism being a drainage groove formed about the circumference of the spool.

11. The hydraulically controlled valve control body of claim 10, wherein the drainage system comprises a drain arranged below a portion of the groove.

12. The valve control body of claim of claim 10, further comprising an intensifier and shim arranged below a portion of the groove for increasing a flow path of fluid.

13. A valve control body, comprising:

a control body;

a first solenoid coil positioned at a first end of the control body;

a second solenoid coil positioned at an opposing second end of the control body;

a spool positioned within the control body between the open and closed solenoid coils; and

means for minimizing fluid accumulation between a contact surface area between the spool and one of the first and second solenoid coils.

14. The valve control valve body of claim 13, wherein the means is a minimized surface area between the spool and one of the first and second solenoid coils.

15. The valve control valve body of claim 13, wherein the means is a seal positioned about a circumference of the spool and in slidable contact with a bore wall of the control body.

16. The valve control valve body of claim 13, wherein the means is a geometric shape milled into the spool for effectuating a pumping of fluid during a movement of the spool.

17. The valve control valve body of claim 13, wherein the means is a drainage system, the drainage system including a groove in the spool in slidable alignment with a drainage passageway.

18. The valve control valve body of claim 13, wherein the means prevents a latching effect between the spool and at least one of the first and the second solenoid coils.

19. A fuel injector, comprising:

a body control valve having an inlet port and working ports;

a first and second solenoid coil positioned at opposing ends of the body control valve;

a slidably mounted spool arranged substantially between the first and second solenoid coils, the spool including a mechanism which at least minimizes

fluid accumulation between an end of the spool and at least one of the first and second solenoid coil;

an intensifier chamber having a piston and plunger assembly, the intensifier chamber being in fluid communication with the working ports;

a high-pressure fuel chamber arranged below a portion of the plunger; and

a needle chamber having a needle responsive to an increased fuel pressure created in the high-pressure fuel chamber.

20. The fuel injector of claim 19, wherein the mechanism is a seal seated within a groove of the spool and in slidable contact with the a bore wall of the control valve.

21. The fuel injector of claim 19, wherein the mechanism is a geometric shape formed into a portion of the spool.

22. The fuel injector of claim 19, further comprising a minimized contact surface area between the spool and at least one of the opposing solenoid coils.

23. The fuel injector of claim 19, further comprising a drainage system in fluid communication with the mechanism, the mechanism being a drainage groove formed about the circumference of the spool.

24. A replacement kit for a valve control body of a fuel injector, comprising:

a spool including an element for reducing or minimizing latching effects between the spool and end caps of the fuel injector.

25. The replacement kit of claim 24, wherein the element is one of a seal

arranged about the spool and a geometric shape in the spool which pumps fluid away from at least one of the end caps of the fuel injector.